

REMARKS

In reply to the Final Office Action of April 18, 2011, Applicants have amended claims 1, 5, and 9. Accordingly, claims 1-11 and 13-40 are pending, with claims 1, 5, and 9 in independent form.

Allowable Claims

Applicants thank the Examiner for indicating that claims 16-20, if rewritten in independent form, would be allowable. Although Applicants have not elected to do so in this reply, Applicants reserve the right to do so in future.

Claim Rejections – 35 U.S.C. § 102

Claims 1, 2, 4, 9, 10, 13-15, 21, 22, 24-27, 29, 32, 34, 35, 37, 38, and 40 stand rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Augusto (U.S. Patent Application Publication No. US 2002/0101895, “Augusto”). Without addressing or conceding that any of these rejections are correct, but merely to advance prosecution, Applicants have amended independent claim 1 in this reply to cover radiation detectors that include a semiconductor body that “corresponds to a PIN diode structure.” Support for this amendment is found in the published version of Applicants’ specification (U.S. Patent Application Publication No. US 2008/0237633, “Specification”) at, for example, paragraph 0036. For the same reasons, Applicants have also amended independent claim 9 to cover radiation detectors where the “filter layer structure forms a portion of the semiconductor body,” and where “the semiconductor body corresponds to a PIN diode structure.” Support for these amendments is found in the Specification at, for example, paragraphs 0036 and 0040.

Applicants believe that amended claim 1 is patentable over Augusto for at least the following reasons. The radiation detectors covered by claim 1 require that the semiconductor body therein correspond to a PIN diode structure. A PIN diode structure is one in which the active region is a near intrinsic semiconductor region, and is positioned between p-type and n-type semiconductor regions that are generally more heavily doped. Claim 1 also requires that the “active region comprises a plurality of functional layers.” Accordingly, the radiation detectors

covered by claim 1 include a semiconductor body with a PIN diode structure that features an active intrinsic semiconductor region with a plurality of functional layers.

As best Applicants can determine, Augusto does not disclose detectors with multiple functional layers within a PIN diode structure. Referring to Figure 8A as exemplary of Augusto's devices, Applicants note that structure of the layers in Figure 8A shows not a PIN diode structure with multiple functional layers in an active region, but instead a series of PN diode structures stacked on top of one another. As would have been appreciated by a person of ordinary skill in the art, the n+ and p+ doped regions in Figure 8A do not form part of the *active* region in a PIN diode structure, they form the contact regions on either side of the active region. Thus, in Figure 8A, the layer identified as the "active layer" can have, at most, a single functional layer (e.g., corresponding to one of the band-gap layers), surrounded on both sides by n+ and p+ doped layers. For this reason, the structure of layers in Figure 8A corresponds not to a PIN diode structure with multiple functional layers within the active region, but to a stack of PN diode structures, each with a single active layer sandwiched between contact layers.

Figures 7A-7D show additional embodiments of Augusto's devices. However, in each of these figures, the devices include *insulating* layers between the filter layers. As would have been appreciated by a person of ordinary skill in the art, PIN diode structures do not include insulators. To the contrary, PIN diode structures include an active intrinsic semiconductor region positioned between doped contact regions. None of these regions is insulating.

For all of these reasons, Applicants submit that Augusto fails to disclose the radiation detectors covered by amended claim 1, and Applicants respectfully request reconsideration and withdrawal of the rejection of claim 1 under 35 U.S.C. § 102(b).

Independent claim 9 has also been amended in this reply to cover radiation detectors that include a semiconductor body that "corresponds to a PIN diode structure," where the active region in the semiconductor body "comprises a plurality of functional layers." For at least the same reasons discussed above in connection with claim 1, amended claim 9 is also patentable over Augusto.

In addition, claim 9 has been amended in this reply to recite that the "filter layer structure forms a portion of the semiconductor body." Referring again to Figures 8A and 7A-7D in Augusto, none of the devices disclosed therein has a filter layer that forms a portion of a

semiconductor body with a PIN diode structure. In Figure 7A, for example, the filter layers shown are not part of a semiconductor body with a PIN diode structure. Instead, the filter layers are positioned between insulating layers, which are not part of a semiconductor body with a PIN diode structure. In Figure 8A, to the extent any of the band-gap layers can be considered to be filter layers, they are not positioned within a semiconductor body with a PIN diode structure. Instead, they are positioned within the active regions of a series of stacked PN diode structures, as explained above.

For all of the foregoing reasons, Applicants submit that claim 9 is patentable over Augusto, and respectfully request reconsideration and withdrawal of the rejection of claim 9 under 35 U.S.C. § 102(b).

Claims 2, 4, 10, 13-15, 21, 22, 24-27, 29, 32, 34, 35, 37, 38, and 40 each depend from one of claims 1 and 9, and are therefore patentable over Augusto for at least the same reasons. Accordingly, Applicants respectfully request reconsideration and withdrawal of the rejections of these claims under 35 U.S.C. § 102(b).

Claim Rejections – 35 U.S.C. § 103

Claims 3, 5-8, 11, 23, 28, 30, 31, 33, 36, and 39 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Augusto in view of Major et al. (U.S. Patent No. 5,689,123, “Major”). Without conceding that any of these rejections are correct, but merely to expedite prosecution, Applicants have amended independent claim 5 in this reply to cover radiation detectors that include a semiconductor body that “corresponds to a PIN diode structure.” Support for this amendment can be found in the Specification at, for example, paragraph 0036. Further, the active region in the semiconductor body includes “a plurality of functional layers.”

As explained above in connection with claim 1, Augusto does not disclose radiation detectors with semiconductor body that corresponds to a PIN diode structure, where the active region includes a plurality of functional layers. Moreover, Major does not cure Augusto’s deficiencies in this regard. Major discloses various materials that can be used to form active layers in semiconductor devices. However, as best Applicants can determine, Major does not disclose PIN diode structures with a plurality of functional layers within the active region. Further, even if Augusto and Major were combined as the Action suggests (which Applicants do

not concede is correct), a person of ordinary skill in the art would rely on Major for its teaching regarding the composition of active layers; Major provides no reason for such a person to modify the nature of the layer structure in Augusto's devices, as shown for example in Figures 7A-7D and 8A in Augusto. Thus, combining Augusto and Major as the Action suggests still would not yield a radiation detector with an internal semiconductor body corresponding to a PIN diode structure and having a plurality of functional layers within the active region.

In view of the foregoing, Applicants submit that independent claim 5 is patentable over Augusto and Major, and respectfully request reconsideration and withdrawal of the rejection of claim 5 under 35 U.S.C. § 103(a).

Claims 3, 6-8, 11, 23, 28, 30, 31, 33, 36, and 39 each depend from one of claims 1, 5, and 9. As explained above, claims 1, 5, and 9 are each patentable over Augusto and Major. For at least the same reasons, claims 3, 6-8, 11, 23, 28, 30, 31, 33, 36, and 39 are also therefore patentable over Augusto and Major, and Applicants respectfully request reconsideration and withdrawal of the rejections of these claims under 35 U.S.C. § 103(a).

Conclusion

In view of the foregoing, Applicants ask that the application be allowed.

Canceled claims, if any, have been canceled without prejudice or disclaimer. Any circumstance in which Applicants have: (a) addressed certain comments of the Examiner does not mean that Applicants concede other comments of the Examiner; (b) made arguments for the patentability of some claims does not mean that there are not other good reasons for patentability of those claims and other claims; or (c) amended or canceled a claim does not mean that Applicants concede any of the Examiner's positions with respect to that claim or other claims.

Applicant : Arndt Jaeger et al.
Serial No. : 10/593,792
Filed : September 21, 2006
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Attorney's Docket No.: 12406-0213US1 / P2004,0273
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This reply is being filed concurrently with a Request for Continued Examination. Fees for the Request for Continued Examination and Petition for Extension of Time are being paid concurrently on the Electronic Filing System (EFS) by way of Deposit Account authorization. Please apply any other charges or credits to Deposit Account 06-1050, referencing Attorney Docket No. 12406-0213US1.

Respectfully submitted,

Date: August 18, 2011

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